

Important Advances in Clinical Medicine

Epitomes of Progress — Physical Medicine and Rehabilitation

The Scientific Board of the California Medical Association presents the following inventory of items of progress in physical medicine and rehabilitation. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in physical medicine and rehabilitation which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Physical Medicine and Rehabilitation of the California Medical Association and the summaries were prepared under its direction.

Reprint requests to: Division of Scientific and Educational Activities,
California Medical Association, 731 Market St., San Francisco, CA 94103

Electromyographic Findings in Upper Motor Neuron Lesions

FROM THE ONSET of clinical electromyography in the 1940's until recently, certain electrical wave forms were considered indicative of direct damage to the lower motor neuron; either the cell body or the axon. Therefore, the presence of these waves could be relied upon to indicate the presence of a peripheral nerve lesion, even when the clinical signs of an upper motor neuron lesion hid signs of a mild lower motor neuron lesion.

In 1967 Goldkamp published his study of 116 hemiplegic patients showing that some 80 percent had electrical waves that were previously assumed to be present only with peripheral nerve lesions; despite the absence of a history of peripheral nerve injury. He concluded that transynaptic effect had caused the electrical changes found. An upper motor neuron lesion, therefore, had produced changes in the lower motor neuron.

Since that time, a preponderance of studies have found these wave forms in patients with upper motor neuron lesions. In a recent paper Taylor reviewed these studies and gave added evidence

that an upper motor neuron lesion is indeed associated with the presence of these wave forms. He studied 22 patients with cervical or high thoracic cord lesions, all of whom showed these wave forms.

The above findings have been attributed to either transynaptic effects on the lower motor neuron, or to loss of a substance that stabilizes the excitability of the muscle cell membrane. The factors that are responsible for such changes are not known.

These studies bring into focus several different principles. Electromyographers must consider the effects of an upper motor neuron lesion and the date of onset. In hemiplegic persons, these wave forms tend to appear after one or two weeks and persist for some 18 weeks, but can persist for longer periods; especially in the distal hand and foot muscles.

For clinicians, it again illustrates the truism that the electrical wave forms are not pathognomic of any disorder. The ability to distinguish one wave form from another can be learned in a few weeks, but such information alone can be grossly misleading. The electromyographic examination must be carried out and interpreted by someone